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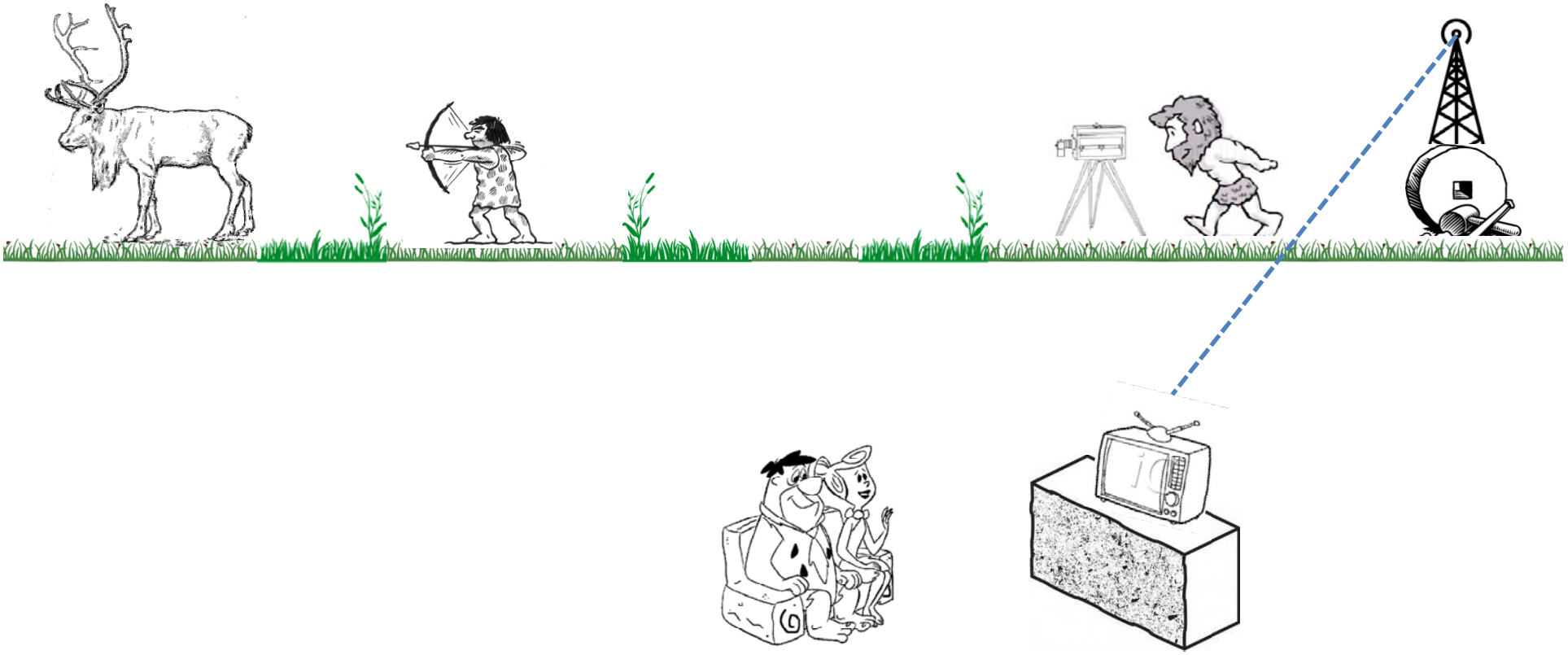
File-based Workflows in Television

TERENA - 5th TF-Media Task Force meeting & Workshop

Pedro Ferreira – pedro.ferreira@mog-solutions.com

In the beginning… everything was simple



DM DIGITAL TV NETWORK
DM DIGITAL TV NETWORK

Still, push only…

Multiple contribution sources

Many distribution channels

Mobile

Web

VOD

Pull!

How did TV evolve to cope with this?

How ***is*** TV evolving to cope with this?

Which formats?

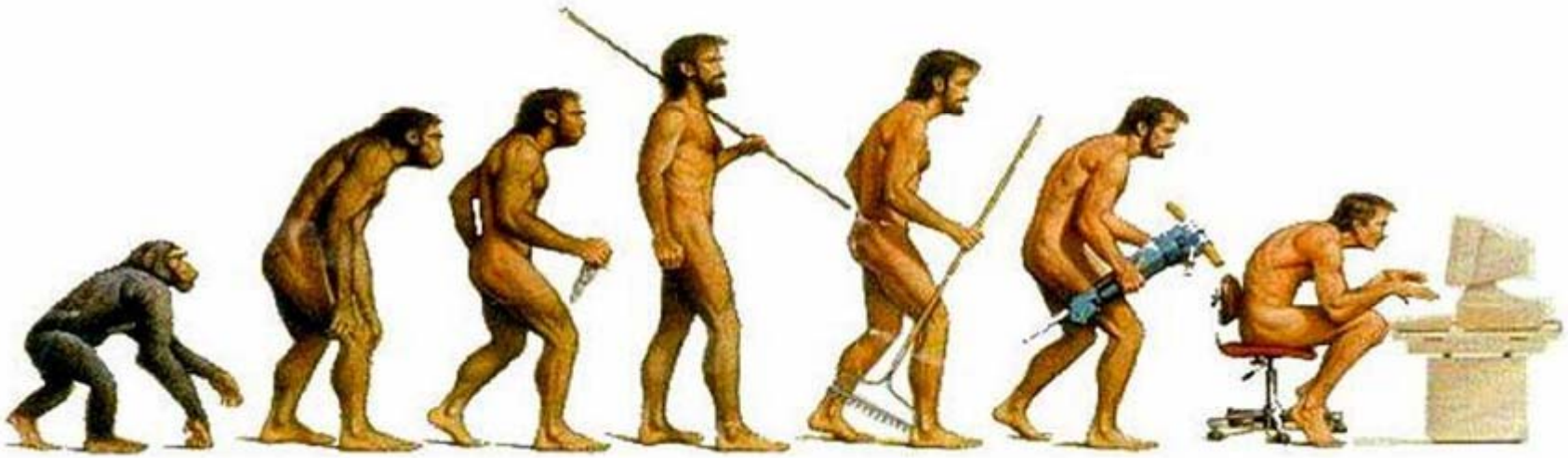
Which workflows?

Which system designs?

The Evolution

of

File-based production



Some time ago, television production moved towards digital.

But handling uncompressed material was complex.

Broadcasting products started using compression technology.

IT equipment performance increased and prices dropped.

IT technology started to invade the professional market.

It became clear that file-based production was the future.

But several incompatible file formats were in use.

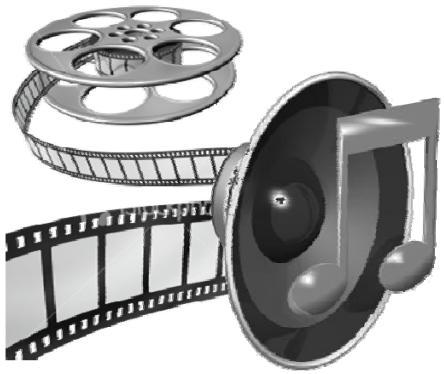
WANTED
STANDARDS

1996

EBU/SMPTE Task Force

for Harmonized Standards

for the Exchange of Programme Material as Bitstreams



Essence

Not a single compression technology will prevail

Systems must handle various formats

Metadata

A new class of program-related data

Should be easily translated between systems

Should be available electronically and linked to the essence

Content = Essence + Metadata

Need to proceed work on standards,

namely on Essence and Metadata

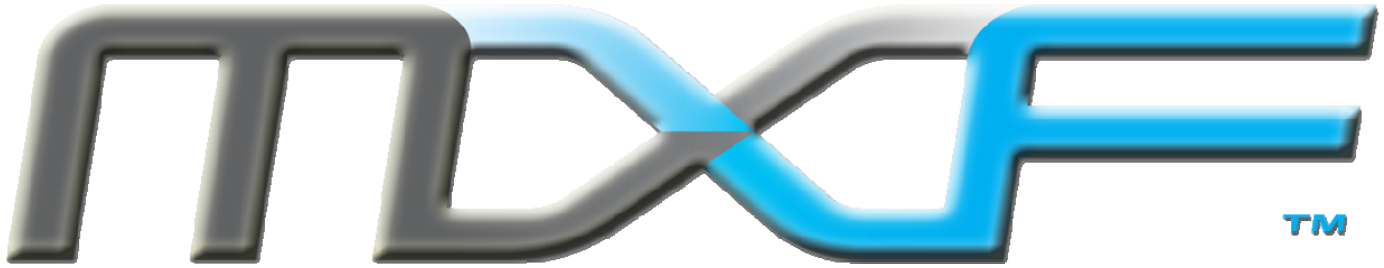
Wrappers

Replace sneakernets and tape

With networks and files

…but, of

d



Material eXchange Format

a standard file format
for the interchange of
Essence and Metadata

Defined in SMPTE S377M

Expandable

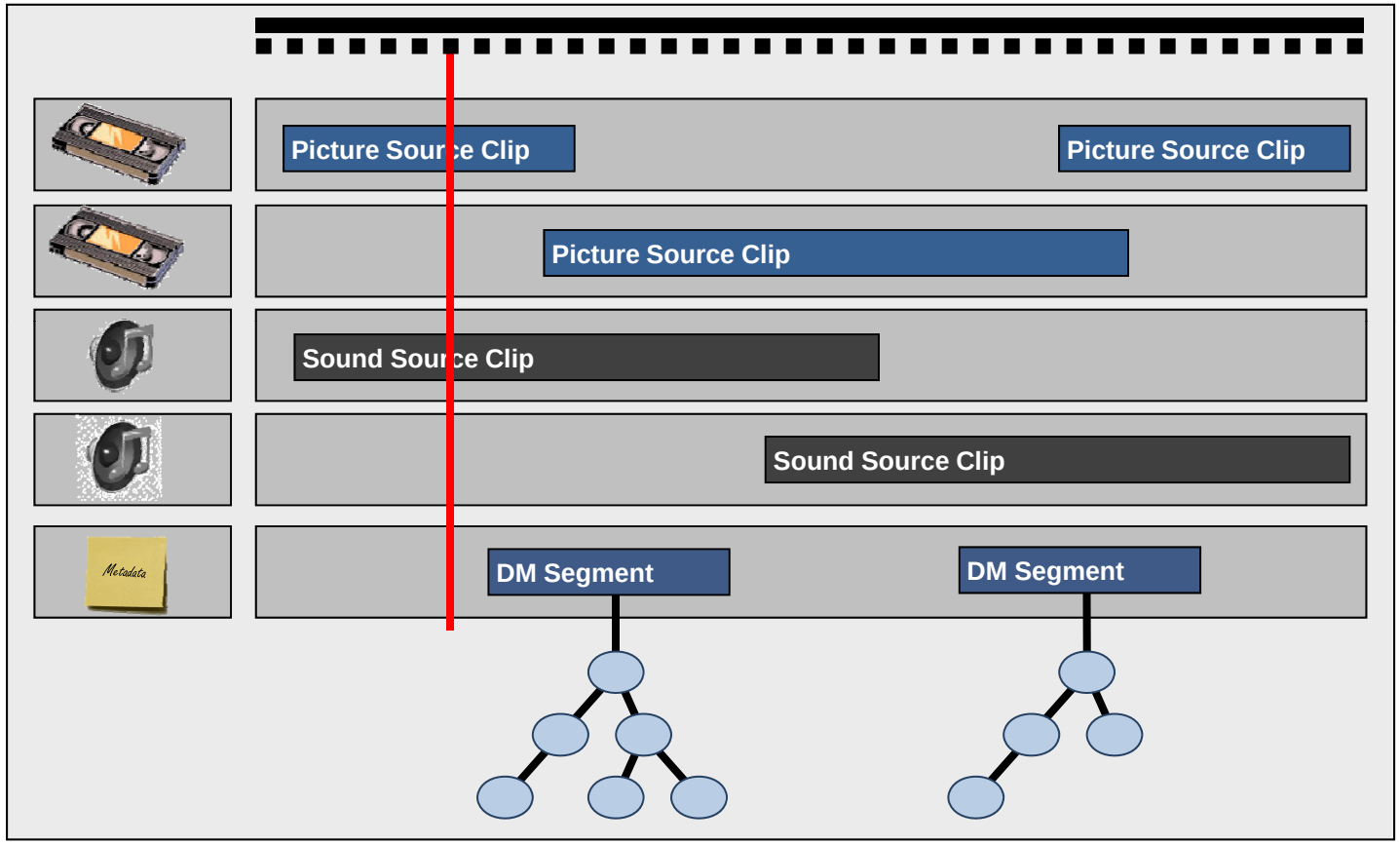
Coding format independent

Agnostic to metadata scheme

Provides technical descriptions

Efficient

Useful for ingested or finished material


Picture Source Clip
Picture Source Clip
Picture Source Clip
Sound Source Clip
Sound Source Clip
Metadata
DM Segment
DM Segment

Introduction of a new Technology

Euphoria

Disillusionment

Real product and real work

Rockley Miller – Multimedia Monitor

“Once I have a file with a ‘.mxf’ extension, I will be able to use it anywhere...”

“It doesn’t work since each product has its own MXF...”

Real products in the market today interchanging with MXF

Slow initial adoption, but backed by strong vendors

Rise in adoption around 2007

Currently MXF is pervasive in production, post, archive, play-out

And in other industries…

STATE-OF-THE-ART:

CAPTURE AND POST FORMATS

Professional Wrappers

Legacy: GXF, LXF, AVI

Professional video formats

MPEG-2 I-Frame, Long GOP

DV variants

JPEG2000

AVC-Intra, AVC Long GOP

ProRes and DNxHD

JPEG2000

Professional audio formats

PCM

Multi-resolution Workflows

Hi-res

Proxies

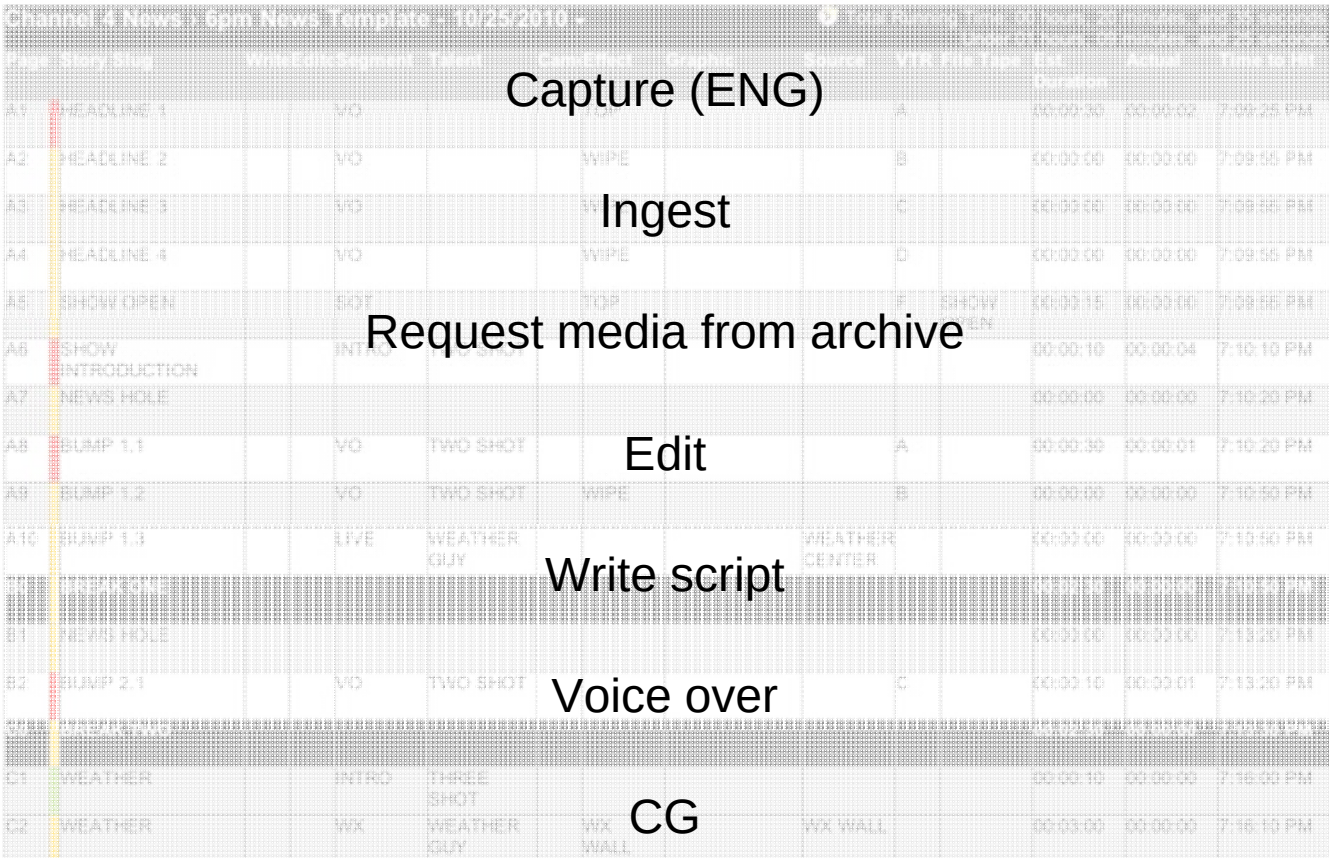
Search, off-line editing, preview/dailies

Typical Workflow:

News Production

Prepare rundown

Prepare story:

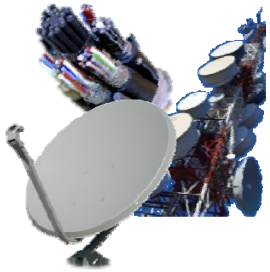


Playout

FROM ONE TO MANY,

TO ANY TO ANY

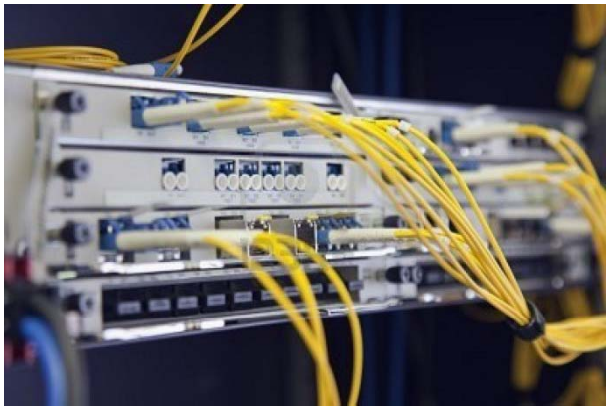
Contribution



Dedicated links

Satellite

IP-based: low-res, high-res



ENG

Tape

Disk

SSD

Mobile, handheld devices

Other Sources

Archive

News Agencies

Stock footage

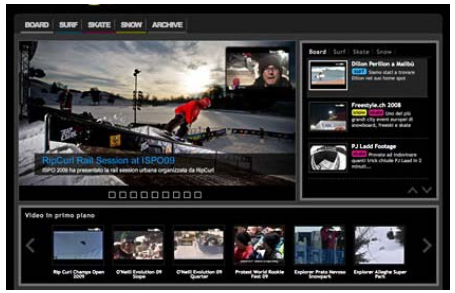
Internet

Distribution

Terrestrial

Satellite

Cable



Web: Live & VOD

Mobile

How is TV adapting to these new challenges?

How to deal with today’s pace and interactivity?

Agility

How to deal with multiple sources?

New interchange channels

Rewrap

Transcode

How to deal with multiple targets?

With different formats

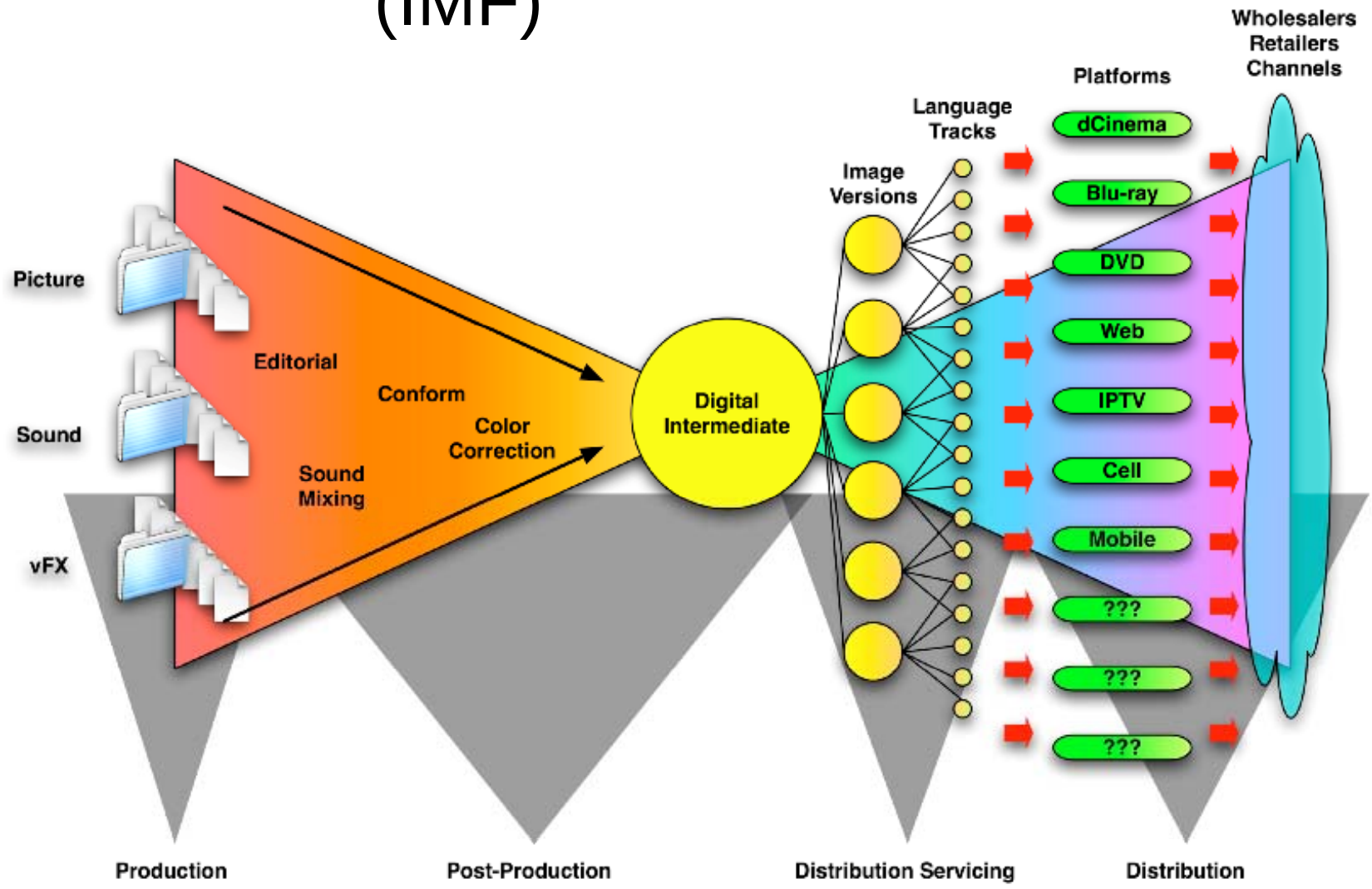
With multiple languages

Accessibility

Closed-captions

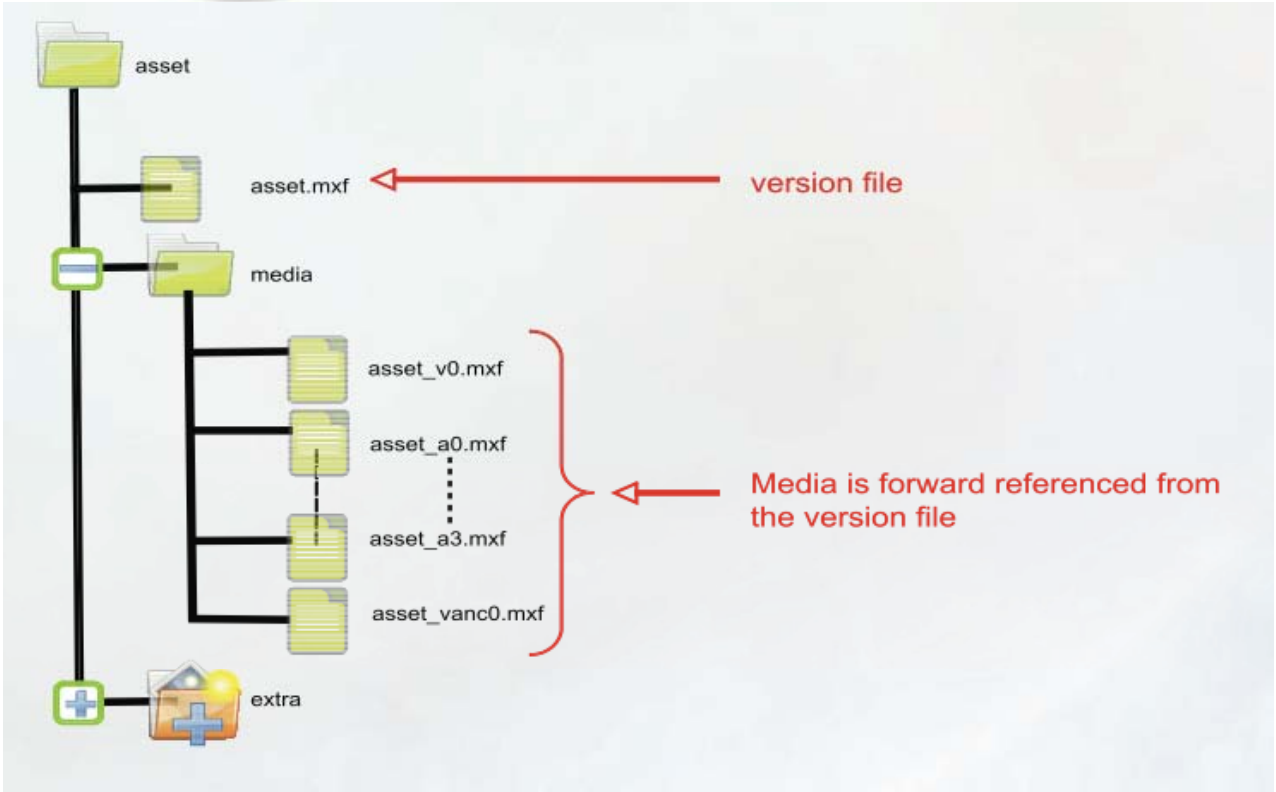
Audio-description

Interoperable Master Format (IMF)



AS-02

REPURPOSE
ARCHIVE
INGEST
POST
DELIVER
DISTRIBUTION


asset
asset.mxf
version file
media
asset_v0.mxf
asset_a0.mxf
asset_a3.mxf
asset_vanc0.mxf
Media is forward referenced from the version file
extra

Asset Management

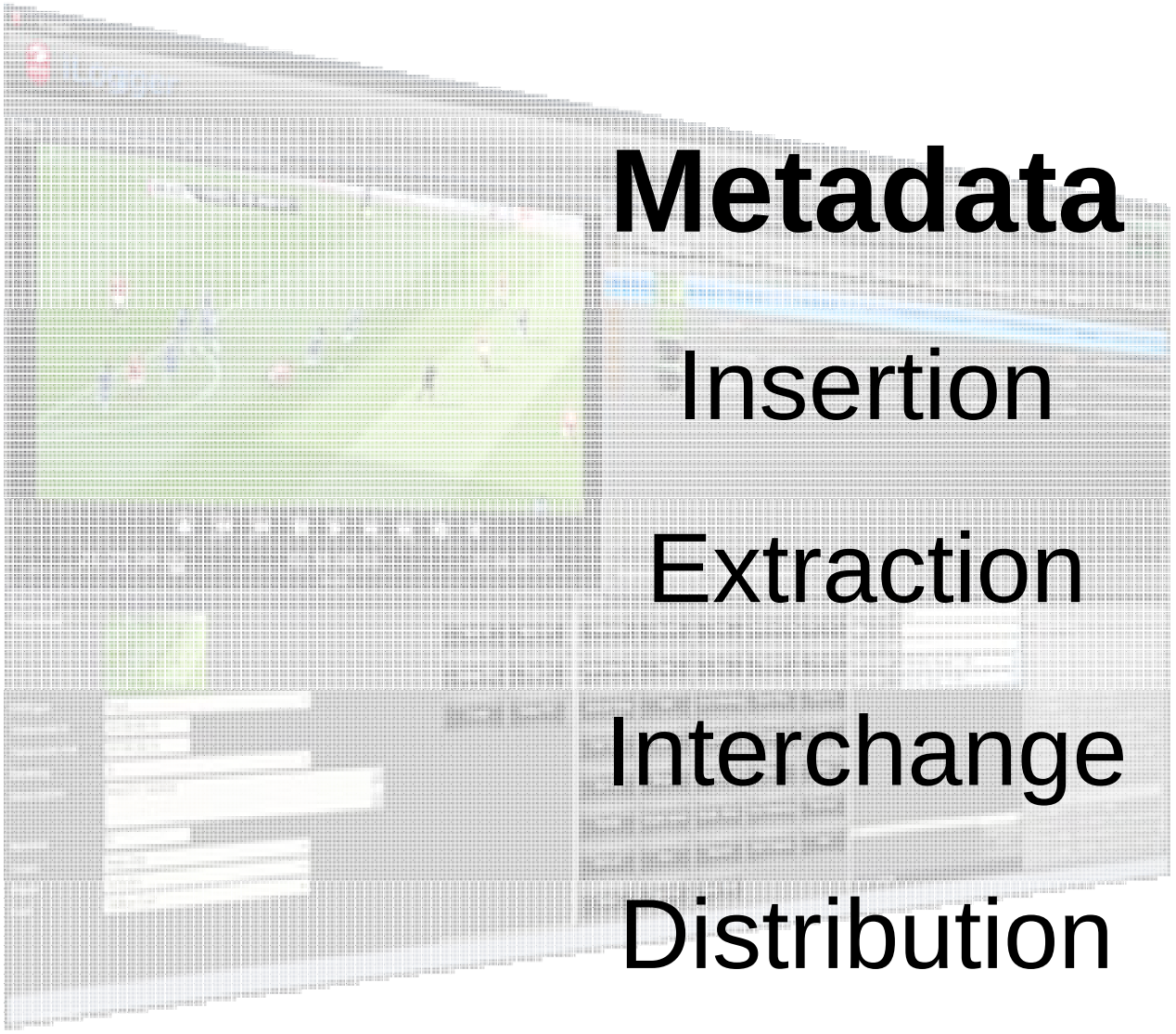
&

Archiving

Most TVs have one or more

Media Asset Management systems

MAMs are typically integrated with the archive



Metadata

Insertion

Extraction

Interchange

Distribution

System Design

Increased flexibility

No vendor lock-in

SOA

Framework for Interoperable Media Services

ADVANCED MEDIA WORKFLOW ASSOCIATION

EBU·UER

"The Cloud"
Collaborative and remote editing
Contribution and primary distribution: CDNs
Ad delivery
Subtitles and captions preparation

The road ahead
Service-centric systems
More flexible workflows
Automatic, more integrated metadata
Simpler to target multiple devices

Thank you

CONTACTS

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